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Terms used
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1 Level set and PDE methods for computer graphics

David Breen, Ron Fedkiw, Ken Museth, Stanley Osher, Guillermo Sapiro, Ross Whitaker
August 2004 **Proceedings of the conference on SIGGRAPH 2004 course notes GRAPH '04**
Publisher: ACM Press
Full text available: pdf(17.07 MB) Additional Information: full citation, abstract

Level set methods, an important class of partial differential equation (PDE) methods, define dynamic surfaces implicitly as the level set (iso-surface) of a sampled, evolving nD function. The course begins with preparatory material that introduces the concept of using partial differential equations to solve problems in computer graphics, geometric modeling and computer vision. This will include the structure and behavior of several different types of differential equations, e.g. the level set eq ...

2 Projectors: advanced graphics and vision techniques

Ramesh Raskar
August 2004 **Proceedings of the conference on SIGGRAPH 2004 course notes GRAPH '04**
Publisher: ACM Press
Full text available: pdf(6.53 MB) Additional Information: full citation

3 Link and channel measurement: A simple mechanism for capturing and replaying wireless channels

Glenn Judd, Peter Steenkiste
August 2005 **Proceeding of the 2005 ACM SIGCOMM workshop on Experimental approaches to wireless network design and analysis E-WIND '05**
Publisher: ACM Press
Full text available: pdf(6.06 MB) Additional Information: full citation, abstract, references, index terms

Physical layer wireless network emulation has the potential to be a powerful experimental tool. An important challenge in physical emulation, and traditional simulation, is to accurately model the wireless channel. In this paper we examine the possibility of using on-card signal strength measurements to capture wireless channel traces. A key advantage of this approach is the simplicity and ubiquity with which these measurements can be obtained since virtually all wireless devices provide the req ...

Keywords: channel capture, emulation, wireless

4 Special issue: AI in engineering

D. Sriram, R. Joobbani
April 1985 **ACM SIGART Bulletin**, Issue 92
Publisher: ACM Press
Full text available: pdf(8.79 MB) Additional Information: full citation, abstract

The papers in this special issue were compiled from responses to the announcement in the July 1984 issue of the SIGART newsletter and notices posted over the ARPAnet. The interest being shown in this area is reflected in the sixty papers received from over six countries. About half the papers were received over the computer network.

5 Terrain database interoperability issues in training with distributed interactive simulation

Guy A. Schiavone, S. Sureshchandran, Kenneth C. Hardis
July 1997 **ACM Transactions on Modeling and Computer Simulation (TOMACS)**, Volume 7 Issue 3
Publisher: ACM Press
Full text available: pdf(443.34 KB) Additional Information: full citation, abstract, references, citings, index terms, review

In Distributed Interactive Simulation (DIS), each participating node is responsible for maintaining its own model of the synthetic environment. Problems may arise if significant inconsistencies are allowed to exist between these separate world views, resulting in unrealistic simulation results or negative training, and a corresponding degradation of interoperability in a DIS simulation exercise. In the DIS community, this is known as the simulator terrain database (TDB) correlation problem. ...

Keywords: distributed interactive simulation, terrain databases

6 Technical session 12: intriguing applications: Incremental detection of text on road signs from video with application to a driving assistant system

Wen Wu, Xilin Chen, Jie Yang
October 2004 **Proceedings of the 12th annual ACM international conference on Multimedia**
Publisher: ACM Press
Full text available: pdf(678.16 KB) Additional Information: full citation, abstract, references, index terms

This paper proposes a fast and robust framework for incrementally detecting text on road signs from natural scene video. The new framework makes two main contributions. First, the framework applies a Divide-and-Conquer strategy to decompose the original task into two sub-tasks, that is, localization of road signs and detection of text. The algorithms for the two sub-tasks are smoothly incorporated into a unified framework through a real time tracking algorithm. Second, the framework provides ...

Keywords: driving assistant system, incremental text detection, natural scene video, road sign

7 Frontmatter (TOC, Letters, Philosophy of computer science, Interviewers needed, Taking software requirements creation from folklore to analysis, SW components and product lines: from business to systems and technology, Software engineering survey)

September 2005 **ACM SIGSOFT Software Engineering Notes**, Volume 30 Issue 5
Publisher: ACM Press
Full text available: pdf(1.98 MB) Additional Information: full citation

8 Wireless integrated network sensors
G. J. Pottie, W. J. Kaiser
May 2000 **Communications of the ACM**, Volume 43 Issue 5
Publisher: ACM Press
Full text available: pdf(303.43 KB) html(40.24 KB) Additional Information: full citation, references, citings, index terms

9 An extensible approach to imagery of gridded data
Geoffrey Dutton
July 1977 **ACM SIGGRAPH Computer Graphics , Proceedings of the 4th annual conference on Computer graphics and interactive techniques SIGGRAPH '77**, Volume 11 Issue 2
Publisher: ACM Press
Full text available: pdf(3.19 MB) Additional Information: full citation, abstract, references, citings

A program offering a variety of cartographic techniques for mapping gridded data is described. Dot-distribution maps, several forms of contour maps and screen-toned maps are currently implemented for plotter and vector CRT. The structure and logic of the program is discussed and illustrated. The approach requires only local access to a data grid in a paging environment, allowing large data sets to be manipulated. Maps output may be plotted at any scale, irrespective of the size of the plotting d ...

Keywords: analytic hill-shading, cartography, contour mapping, device independence, dot-distribution mapping, gridded data, halftone imagery, inclined contour mapping, spatial analysis, spatial gradients, thematic mapping, vector graphics, virtual graphics, virtual memory

10 Conference abstracts
January 1977 **Proceedings of the 5th annual ACM computer science conference**
Publisher: ACM Press
Full text available: pdf(3.14 MB) Additional Information: full citation, abstract, index terms

One problem in computer program testing arises when errors are found and corrected after a portion of the tests have run properly. How can it be shown that a fix to one area of the code does not adversely affect the execution of another area? What is needed is a quantitative method for assuring that new program modifications do not introduce new errors into the code. This model considers the retest philosophy that every program instruction that could possibly be reached and tested from the ...

11 Improving static and dynamic registration in an optical see-through HMD
Ronald Azuma, Gary Bishop
July 1994 **Proceedings of the 21st annual conference on Computer graphics and interactive techniques**
Publisher: ACM Press
Full text available: pdf(321.33 KB) ps(1.65 MB) Additional Information: full citation, abstract, references, citings, index terms

In Augmented Reality, see-through HMDs superimpose virtual 3D objects on the real

world. This technology has the potential to enhance a user's perception and interaction with the real world. However, many Augmented Reality applications will not be accepted until we can accurately register virtual objects with their real counterparts. In previous systems, such registration was achieved only from a limited range of viewpoints, when the user kept his head still. This paper offers improved regi ...

Keywords: augmented reality, calibration, registration

12 An EyeTap video-based featureless projective motion estimation assisted by gyroscopic tracking for wearable computer mediated reality

Chris Aimone, James Fung, Steve Mann

October 2003 **Personal and Ubiquitous Computing**, Volume 7 Issue 5

Publisher: Springer-Verlag

Full text available: pdf(717.70 KB) Additional Information: full citation, abstract, citings, index terms

In this paper we present a computationally economical method of recovering the projective motion of head mounted cameras or EyeTap devices, for use in wearable computer-mediated reality. The tracking system combines featureless vision and inertial methods in a closed loop system to achieve accurate robust head tracking using inexpensive sensors. The combination of inertial and vision techniques provides the high accuracy visual registration needed for fitting computer graphics onto real images a ...

Keywords: Augmented reality, Drift corrrection, EyeTap, Hybrid tracking, Mediated reality, Video head tracking

13 Paper session DB-8 (databases): query optimisation: Query workload-aware overlay construction using histograms

Georgia Koloniari, Yannis Petrakis, Evaggelia Pitoura, Thodoris Tsotsos

October 2005 **Proceedings of the 14th ACM international conference on Information and knowledge management CIKM '05**

Publisher: ACM Press

Full text available: pdf(238.28 KB) Additional Information: full citation, abstract, references, index terms

Peer-to-peer(p2p) systems over an efficient means of data sharing among a dynamically changing set of a large number of a tonomous nodes.Each node in a p2p system is connected with a small number of other nodes thus creating an overlay network of nodes. A query posed at a node is routed through the overlay network towards nodes hosting data items that satisfy it. In this paper, we consider building overlays that exploit the query workload so that nodes are clustered based on their results to a g ...

Keywords: clustering, overlay network, peer-to-peer systems, query routing, range queries, small worlds

14 Real-time vision-based camera tracking for augmented reality applications

Dieter Koller, Gudrun Klinker, Eric Rose, David Breen, Ross Whitaker, Mihran Tuceryan

September 1997 **Proceedings of the ACM symposium on Virtual reality software and technology**

Publisher: ACM Press

Full text available: pdf(1.20 MB) Additional Information: full citation, references, citings, index terms

15 3D Galatea: Entry of three-dimensional moving points from multiple perspective

views
Steven A. MacKay, Richard E. Sayre, Michael J. Potel
July 1982 **ACM SIGGRAPH Computer Graphics , Proceedings of the 9th annual conference on Computer graphics and interactive techniques SIGGRAPH '82**, Volume 16 Issue 3
Publisher: ACM Press

Full text available: pdf(1.57 MB) Additional Information: full citation, abstract, references, citings, index terms

We describe an interactive graphics system for the entry of three-dimensional moving points from multiple perspective views. This work represents a major extension of Galatea, our system for graphics-assisted 2D motion analysis. 3D Galatea permits reconstruction of 3D time-dependent positions from 2D entries in two or more perspective views. The system supports a general approach for calibrating perspective views. This method, based on work of Sutherland, uses a known 3D referenc ...

16 Vertical handoffs in wireless overlay networks
Mark Stemm, Randy H. Katz
December 1998 **Mobile Networks and Applications**, Volume 3 Issue 4
Publisher: Kluwer Academic Publishers

Full text available: pdf(770.58 KB) Additional Information: full citation, abstract, references, citings, index terms

No single wireless network technology simultaneously provides a low latency, high bandwidth, wide area data service to a large number of mobile users. Wireless Overlay Networks – a hierarchical structure of room-size, building-size, and wide area data networks – solve the problem of providing network connectivity to a large number of mobile users in an efficient and scalable way. The specific topology of cells and the wide variety of network technologies that comprise wireless o ...

17 Visual registration for unprepared augmented reality environments
Ke Xu, Simon J. D. Prince, Adrian David Cheok, Yan Qiu, Krishnamoorthy Ganesh Kumar
October 2003 **Personal and Ubiquitous Computing**, Volume 7 Issue 5
Publisher: Springer-Verlag
Full text available: pdf(902.04 KB) Additional Information: full citation, abstract, index terms

Despite the increasing sophistication of augmented reality (AR) tracking technology, tracking in unprepared environments still remains an enormous challenge according to a recent survey. Most current systems are based on a calculation of the optical flow between the current and previous frames to adjust the label position. Here we present two alternative algorithms based on geometrical image constraints. The first is based on epipolar geometry and provides a general description of the constraint ...

Keywords: Augmented reality, Fundamental matrix, Homography, Optical flow, Vision based tracking

18 Resilient overlay networks
David Andersen, Hari Balakrishnan, Frans Kaashoek, Robert Morris
October 2001 **ACM SIGOPS Operating Systems Review , Proceedings of the eighteenth ACM symposium on Operating systems principles SOSP '01**, Volume 35 Issue 5
Publisher: ACM Press

Full text available: pdf(1.50 MB) Additional Information: full citation, abstract, references, citings, index terms, review

A Resilient Overlay Network (RON) is an architecture that allows distributed Internet applications to detect and recover from path outages and periods of degraded

performance within several seconds, improving over today's wide-area routing protocols that take at least several minutes to recover. A RON is an application-layer overlay on top of the existing Internet routing substrate. The RON nodes monitor the functioning and quality of the Internet paths among themselves, and use this information ...

19 Three-dimensional medical imaging: algorithms and computer systems

M. R. Stytz, G. Frieder, O. Frieder
December 1991 **ACM Computing Surveys (CSUR)**, Volume 23 Issue 4
Publisher: ACM Press

Full text available: pdf(7.38 MB) Additional Information: full citation, references, citings, index terms, review

Keywords: Computer graphics, medical imaging, surface rendering, three-dimensional imaging, volume rendering

20 An entity maintenance and connection service for sensor networks

Brian Blum, Prashant Nagaraddi, Anthony Wood, Tarek Abdelzaher, Sang Son, Jack Stankovic
May 2003 **Proceedings of the 1st international conference on Mobile systems, applications and services MobiSys '03**
Publisher: ACM Press
Full text available: pdf(294.88 KB) Additional Information: full citation, abstract, references

In this paper, we present a middleware architecture for coordination services in sensor networks that facilitates interaction between groups of sensors which monitor different environmental events. It sits on top of the native routing infrastructure and exports the abstraction of mobile communication endpoints maintained at the locations of such events. A single logical destination is created and maintained for every environmental event of interest. Such destinations are uniquely labeled and can ...

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Wireless Data Communications - by Pahlavan - 93 citations

Control of **overlay registration** patent
The method comprises estimating a state using **moving horizon estimation** and determining an input of the **registration overlay** using the state. ...
www.freshpatents.com/ Control-of-**overlay-registration**-dt20050421ptan20050083243.php - 25k - Cached - Similar pages

Control of **overlay registration** patent
[0014] An improved technique for controlling **registration overlay** is disclosed. In some embodiments, the system performs a **moving horizon estimation** to ...
www.freshpatents.com/ Control-of-**overlay-registration**-dt20050421ptan20050083243.php?type=description - 30k - Cached - Similar pages

US Pregrant 20050083243 - Control of **overlay registration**
A system and method are disclosed for controlling a **registration overlay**. The method comprises estimating a state using **moving horizon estimation** and ...
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2003 IEEE CONFERENCE ONCONTROL APPLICATIONS
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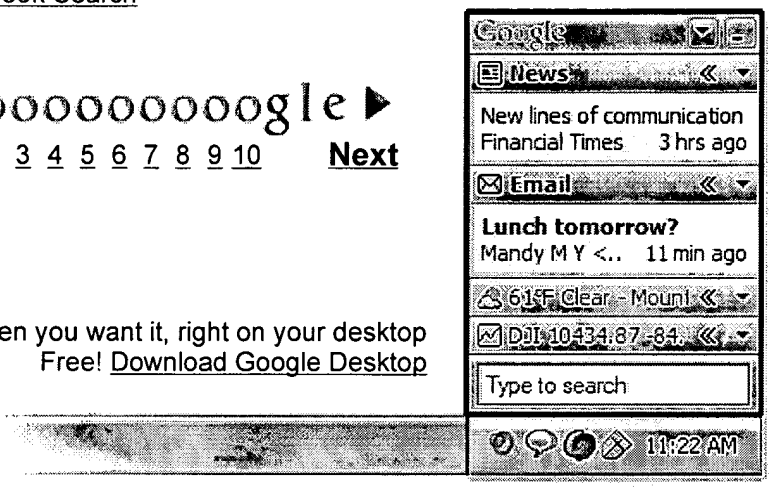

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04/21/05 | **#20050083243** | **Browse Patent Applications:** Prev - Next | Browse Indu
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Control of overlay registration

A system and method are disclosed for controlling a registration overlay. The metho estimating a state using moving horizon estimation and determining an input of the r overlay using the state. The system comprises an estimator configured to determine moving horizon estimation; and a regulator configured to determine an input of the r overlay using the state.

Agent: Van Pelt & Yi LLP - Cupertino, CA, US
Inventor: Scott A. Middlebrooks
Class: 343797000 (USPTO), H01L021/00 (Intl Class)

Brief Patent Description - Full Patent Description - Patent Application Claims

FIELD OF THE INVENTION

[0001] The present invention relates generally to semiconductor processing. More sp overlay registration control technique is disclosed.

BACKGROUND OF THE INVENTION

[0002] Semiconductor devices are commonly fabricated using lithography technique of material are deposited onto or etched away from a wafer to form devices and circu after a layer of material is deposited or etched and before the wafer is further proces measured and realigned with an alignment tool to reduce any errors resulting from m semiconductor devices shrink in size, the requirements for controlling the misalignm become more stringent. Many systems in existence today employ an overlay registra to reduce overlay misalignment errors.

[0003] FIG. 1 is a diagram illustrating a wafer used in an overlay registration proces includes a number of dies 102. On each die, there are a number of test patterns 106.

there are four test patterns that are measured by the alignment tool, resulting in four misalignment vectors 104. The misalignment vectors are typically calculated as the s the interfield errors (also referred to as grid errors) and intrafield errors (also referrec errors).

[0004] In Proceedings of SPIE, Microlithography 2003, 5044-2 entitled "OPTIMAL PREDICTIVE CONTROL OF OVERLAY LITHOGRAPHY IMPLEMENTED IN by Scott Middlebrooks, which is incorporated herein by reference for all purposes, M describes a model predictive controller that estimates system states and regulates the desired targets. The controller employs a Kalman filter to estimate the current values states given measured outputs. Given an optimal estimate, a regulator is used to driv system states to desired targets. The controller attempts to reject the process disturba input move, and is known as a "deadbeat" controller.

[0005] Although this deadbeat controller, which includes using a Kalman filter for e states, is useful in misalignment correction, several issues remain. It would be useful account the constraints of the system, such as the range of valid inputs, and states. A approach to handling values that are out of bound is to clip these values; however, cl results in sub-optimal selection of values. Although estimating states using a Kalmai well for linear systems, it may introduce errors and provide sub-optimal and unstabl for nonlinear systems. It would be useful to have a controller that can handle both in constraints as well as being able to handle both linear and non-linear systems.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] The present invention will be readily understood by the following detailed de conjunction with the accompanying drawings, wherein like reference numerals desig structural elements, and in which:

[0007] FIG. 1 is a diagram illustrating a wafer used in an overlay registration proces

[0008] FIG. 2 is a system diagram illustrating a controller embodiment.

[0009] FIG. 3 is a flowchart illustrating the control process of an overlay registration embodiment.

[0010] FIG. 4 is a flowchart of a controller process according to another overlay regi embodiment.

[0011] FIG. 5 is a diagram illustrating the operations of moving horizon estimation i dimension.

DETAILED DESCRIPTION

[0012] The invention can be implemented in numerous ways, including as a process, system, a composition of matter, a computer readable medium such as a computer re medium or a computer network wherein program instructions are sent over optical o communication links. In this specification, these implementations, or any other form invention may take, are referred to as techniques. In general, the order of the steps of processes may be altered within the scope of the invention.

[0013] A detailed description of one or more embodiments of the invention is provic with accompanying figures that illustrate the principles of the invention. The inventi in connection with such embodiments, but the invention is not limited to any embod: scope of the invention is limited only by the claims and the invention encompasses n alternatives, modifications and equivalents. Numerous specific details are set forth ir description in order to provide a thorough understanding of the invention. These det: for the purpose of example and invention may be practiced according to the claims w all of these specific details. For the purpose of clarity, technical material that is know technical fields related to the invention has not been described in detail so that the in unnecessarily obscured.

[0014] An improved technique for controlling registration overlay is disclosed. In so embodiments, the system performs a moving horizon estimation to estimate state, an input of the registration overlay using an objective function subject to constraints. In embodiments, the estimated states are subject to state constraints. In some embodim regulator objective function is minimized subject to input constraints. In some embo system employs an estimator objective function used to derive the optimal estimated regulator objective function used to derive the optimal inputs based on the estimated optimization problems may be solved using techniques including quadratic program programming, or any other appropriate techniques. In some embodiments, a state dis is used to remove the steady-state offsets that are due to mismatch between predictio measurements.

[0015] FIG. 2 is a system diagram illustrating a controller embodiment. The system model used to describe the relationship between lithography stepper 202 and overlay 204. In this embodiment, the model is expressed as: $1 \; x \; t = Ax + Bu + y = Cx \; (1)$

[0016] where A and B and C are model coefficients, x represents the state of the syst represents the inputs of the system, y represents the outputs of the system, and .omeg noise that is present in the system. The inputs typically refer to system parameters th manipulated by a user of the system. The states refer to information that characterize they typically have some correspondence with the inputs. The outputs typically refer measurements taken on the system. The model of the system may vary for different e For example, it may be a linear function or a nonlinear function. Since the model fur coefficients typically are not perfect representations of the system being controlled, i properly adjust the system to achieve desired outputs, measurements are taken durin process to derive the coefficients and sometimes the model function itself. More det: estimation process will be discussed below.

[0017] A regulator 200 is used to provide system inputs to drive the system states to The regulator is given a target vector z.sub.k.sup.ref, which specifies the goal of the embodiment, the goal of the controller is to regulate the overall process to minimize errors, thus the target vector z.sub.k.sup.ref is a vector of 0. Different target vectors i other embodiments. In this embodiment, the input, represented as a vector u.sub.k, ir of a lithography stepper 202 such as translational movement of the wafer in x and y e wafer rotation, reticle magnification, asymmetric magnification, reticle rotation, asyı rotation, as well as any other appropriate configuration parameters. The lithography the relative positioning of the wafer by adjusting the wafer, the mask or any other ap devices according to its input.

[0018] An overlay metrology tool 204 measures the position of the wafer and provid

y.sub.k. In some embodiments, y.sub.k is represented using misalignment vectors sii shown in FIG. 1. An estimator 206 reconstructs the system states and provides an es vector {circumflex over (x)}.sub.k based on the input of the lithography stepper u.su model and the output y.sub.k. The states characterize the system, and may include pa as wafer translation in x and y directions, wafer scale in x and y directions, wafer rot nonorthogonality, reticle magnification, asymmetric magnification, reticle rotation, a reticle rotation, as well as process disturbances in the previously mentioned states. A states have certain correspondence to the inputs, and in some embodiments the state: may share certain variables, they are not necessarily equivalent. For example, the sta degrees of rotation of the wafer while the input may indicate the number of rotations results in such a rotation.

[0019] The estimator is designed to find the most likely states given the model, the i: measured outputs. Typically, this is achieved by adjusting the model to fit measurem best it can. An estimator objective function is typically formulated to minimize the d between the measurements and the predictions subject to the constraints on the estim estimated states are sent back to regulator 200, which has a regulator objective funct to express the performance objective of the controller. The regulator objective functi defined by the user. According to the regulator objective function, the regulator driv states to desired targets z.sub.k.sup.ref based on the estimated state and computes a r inputs for tracking z.sub.k.sup.ref closely, using the estimated state as the initial star the optimization.

[0020] Ideally, the estimator would provide the optimal estimated states to the regul regulator would then provide an input to minimize the misalignment errors and meet target. In real systems, however, the regulator objective function is frequently subjec constraints that preclude such an optimal input from being usable. For example, an i may be that the magnification is between 0 and 1.0; therefore an optimal input with a of 5.0 is not reasonable. The regulator's objective function explicitly takes into accou constraint and provides the best practical input.

Previous Patent Application:
Triaxial antenna coil

Next Patent Application:
Eccentric spiral antenna
Industry Class:
Communications: radio wave antennas

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PGPUB-DOCUMENT-NUMBER: 20050083243
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DOCUMENT-IDENTIFIER: US 20050083243 A1

TITLE: Control of overlay registration

PUBLICATION-DATE: April 21, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY
Middlebrooks, Scott A.	Sandy	OR	US

US-CL-CURRENT: 343/797; 438/10

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PGPUB-DOCUMENT-NUMBER: 20050083243
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050083243 A1

TITLE: Control of overlay registration

PUBLICATION-DATE: April 21, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY
Middlebrooks, Scott A..	Sandy	OR	US

US-CL-CURRENT: 343/797; 438/10

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

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REGISTRATIONS	5318
OVERLAY	57535
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SEMICONDUCTOR	526991
SEMICONDUCTORS	65050
MOVING	1119290
MOVINGS	42
HORIZON	13143
HORIZONS	3438
ESTIMAT$	0
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